ASOS MODIFICATION NOTE 20 (for Electronics Technicians)
Engineering Division
W/OSO321:BGM/AJW

SUBJECT	:	ACU Memory Firmware Version 2.2 and ACU CPU Firmware 1.81
PURPOSE	:	To add GS-200 communication enhancements for the ASOS
EQUIPMENT AFFECTED:		ASOS Acquisition Control Unit (AACU)
PARTS REQUIRED	:	CPU Microcircuit P/N 62828-45000-1 CPU Microcircuit P/N 62828-45001-1 ACU Memory Microcircuit P/N 62828-45002-1 ACU Memory Microcircuit P/N 62828-45003-1 ACU Memory Microcircuit P/N 62828-45004-1 ACU Memory Microcircuit P/N 62828-45005-1
MOD PROCUREMENT	:	The above parts are available through NLSC as three separate EPROM sets. One set of CPU EPROMS for each ACU CPU, one set of ACU memory EPROMS, and one set of voice EPROMS are required. Technicians should order S100-1A2A20-U11 voice EPROMS, S100-1A2A1-U29 (order two sets for class II sites) ACU CPU EPROMs, and S100-1A2A3-U8, version 2.2 ACU memory EPROMS for each site listed in Appendix E. Return old EPROMS to NRC.
SPECIAL TOOLS REQUIRED	:	IC insertion tool Small flat blade screwdriver Conductive foam Electrostatic discharge (ESD) straps
TIME REQUIRED	:	1 hour
EFFECT ON OTHER INSTRUCTIONS	:	EHB-11, section 3.6, Modification Notes 14 and 15 are to be installed in conjunction with this modification. Modification Note 10 and the errata are superseded by this modification note. Software change descriptions in appendixes D, E, and F of Modification Note 10 still apply. Remove Modification Note 29, if installed, before starting this modification.
AUTHORIZATION	:	This modification is authorized by ECP E94SM05F120.
VERIFICATION STATEMENT	:	This modification has been tested for operational integrity at the sites listed in Appendix B and the Engineering Design Branch laboratory.

GENERAL

This modification note provides procedures to upgrade the ASOS software by removing and replacing erasable programmable read only memory (EPROM). This note provides procedures for "Before Installing Firmware" and "After Installing Firmware." Appendix C, attached to this note, contains information on changes and corrections implemented in firmware version 2.2. Before installing Modification Note 20, reference EHB-11, section 3.6, ASOS Modification Notes 10, 14, and 15. The voice processor firmware, Modification Note 14 is required to be installed in conjunction with this modification.

PROCEDURE

Follow installation instructions for EPROMs U8, U7, U17, and U21 on the ACU memory board 1A2A3, and EPROMs U29 and U30 on the ACU CPU boards 1A2A1 and 1A2A2.

CAUTION

Be careful to protect the electronics on the ACU memory and CPU boards during this procedure. Do not reconfigure any jumpers on the ACU memory or the ACU CPU boards unless instructed to do so by the procedure.

BEFORE INSTALLING FIRMWARE

1. Call the AOMC at 1-800-242-8194 and provide notification on which ASOS you will be installing new firmware. Confirm that the AOMC will provide access to the site-specific data base. Coordinate with the AOMC so the data base is available. Upload current configuration before installing the new firmware.

2. Get approval of the responsible MIC/OIC before starting installation. You may install on any day of the month if restrictions in steps 3 and 4 are satisfied.

3. **Commissioned Sites Only**: Do not start installation during bad weather, precipitation, instrument flight rule (IFR) conditions, or if any of these conditions are expected within 3 hours. These meteorological conditions will be defined by the responsible MIC/OIC.

4. Do not start firmware installation at a time that will conflict with scheduled synoptic observations at 00, 03, 06, 09, 12, 15, 18, and 21Z. Although about 45 minutes should be sufficient, allow one hour to complete installation and restart ASOS.

5. Immediately before beginning work at NWS staffed sites, the MIC/OIC/ Observer will inform the tower and any other critical users that ASOS will be shut off for firmware upgrade. At an unstaffed site the el tech will inform the tower using Controller Video Displays (CVD) and Operator Interface Devices (OID) to log off and shut down display power to avoid confusion. Commissioned sites only, are to download the following data to the laptop using the direct command mode: 5-minute data (12 hrs.), SYSLOG information (24 hrs.), SHEF messages (24 hrs.), and any 2-hour archive files.

6. Do not begin the installation process, i.e., halt ASOS, until immediately after an hourly observation has been transmitted. At NWS-staffed sites, normal backup observing procedures will be implemented.

7. Disable all hardwire and dial communication ports to AFOS (REVUE-SITE-CONFIG-COMMS). Go into the AOMC page (REVUE-SITE-VERSION-AOMC); wait for the external communication and the site physical lines to change from "AUTO UPLOAD REQ" to "COMPLETE" before going to the next step. The system voice function will automatically broadcast a "not available" message when the ACU power is turned off.

8. Make the appropriate SYSLOG entries (MAINT-ACT-FMK) Mod 20
   1. Log on as **TECH**.
   2. Key the **MAINT** screen.
   3. Key the **ACTION** page.
   4. Key **START** - Stop here and preform Mod 20.

9. Continue with Appendix A, Instructions for ASOS Software Version Upgrade. Once the steps in Appendix A have been completed, continue with "After Installing Firmware," step 10.

AFTER INSTALLING FIRMWARE

See page 4 for a description of the time required to reboot ASOS and sensor response time after a new firmware load.

10. When ASOS is restarted at unstaffed sites, call to inform towers using CVDs and OIDs to turn on their displays. (At staffed sites, the MIC/OIC observer will call the tower.)

11. If on-site NWS staff provides backup while the installation is underway, no special observation is needed when ASOS is restarted. Proceed to step 12.

    If there is no backup at a site and a record observation was missed during the installation, a special observation must be taken when ASOS is restarted. The el tech should take the following steps at the ASOS keyboard after installation:
    1. Press [SIGN].

2. Type his/her initials and press [RETURN].
3. Type the observer level password and press [RETURN].
4. Press [GENOB].
5. Press [SPECL].
6. Press [EXIT].
7. Press [SIGN].
8. Type his/her initials again and press [RETURN].
9. Press [RETURN] twice. This signs the "observer" off ASOS.
10. Leave ASOS running.

Note: The "observer" must sign off before the 5-minute edit time is up.

12. Inform the office staff that ASOS is again operational. If less than 25 minutes remain until the next hourly observation, augmentation of the ceiling may be required. It might also be necessary to augment several elements or even the entire observation. The chart below indicates how long it takes after a start up for ASOS to report each observation element automatically.

Times Needed for Elements to be Reported Automatically

	Minimum	Maximum
Pressure	60 seconds	10 minutes
Precipitation Amount	60 seconds	*
Wind direction	2 minutes	7 minutes
Wind speed	2 minutes	7 minutes
Precipitation Type	2 minutes	*
Temperature	5 minutes	10 minutes
Dew Point	5 minutes	10 minutes
Visibility	10 minutes	15 minutes
Obstruction to Visibility	10 minutes	*
Ceiling	30 minutes	35 minutes

* Maximum time not applicable since phenomena may not be present. Minimum time applies if phenomena are present.

13. Verify that ASOS transmitted an hourly observation. Call the AOMC at 1-800-242-8194 and tell the operator:
1. Your location.
2. That installation of the new firmware has been completed.
3. That ASOS is operational.

14. Enter in the SYSLOG that maintenance has been completed.
1. Key the **MAINT** screen.
2. Key the **ACTION** page.
3. Key **FMK** - Enter the Field Mod Kit (FMK) number as follows: **Mod 20**
On the second line of the screen verify that only mod 20 is displayed. Complete by entering **Y** in the Y/N if only mod 20 is displayed. If mods 14 and 15 were completed, make appropriate log entries.
4. Check the **SYSLOG** and verify the **FMK** message. Notify the AOMC via telephone that mod 20 and any other mods have been completed.

15. At an expansion site with ATCT, the el tech will contact the ATCT and supply information on the following:

1. ASOS maintenance is completed.
2. ASOS is restored to service.
3. Tower CVDs and OIDs need to be turned on, and TRACON displays need to turned on.

Reporting Modification

Target date for completion of this modification is 30 days after receipt of parts. Report completed modification on a Weather Service Form A-26 maintenance record, per instructions in EHB-4, Part 2, Appendix F, using reporting code AACU. An example provided in Appendix D. If this modification is installed in conjunction with

Modification Notes 14 and/or 15, a separate Weather Service Form A-26 must be completed for each modification note.

NOTE:
Parts removed (EPROMs) should be returned to NRC as S100-FMK015D.OLD. NRC will be reprogramming the EPROMs for other ASOS applications.

Acting Chief, Engineering Division

Appendix A
Appendix B
Appendix C
Appendix D
Appendix E

W/OSO321:BGMcCormick/AJWissman:rz:8/8/95:disk EHB-11-G:redone:8/8/95:redone 8/21/95:redone 8/22/95
"20.H11" spellchecked

INSTRUCTIONS

FIELD MODIFICATION KIT - ASOS SOFTWARE VERSION UPGRADE

1. UPGRADING ASOS SOFTWARE

1.1 GENERAL

All ASOS application software is contained on the four erasable programmable read only memory (EPROM) integrated circuits (IC) on ACU memory board 1A2A3. Figure 1 illustrates the ACU memory board and identifies the four EPROMs (U8, U17, U7, and U21). The EPROMs are 32-pin dual in-line package (DIP) CMOS devices, each providing 512K x 8 bits of storage. Upgrading ASOS software requires only replacing the four EPROMs on the ACU memory board with higher revision level ICs.

All pSOS ASOS application software is contained on the four EPROM ICs on the ACU CPU board lA2Al and lA2A2. Figure 2 illustrates the ACU CPU board and identifies the two EPROMs (U29 and U30). The EPROMs are 28-pin DIP CMOS devices, each providing 256K x 8 bits of storage. Upgrading pSOS ASOS software requires only replacing the two EPROMs on the ACU CPU board with higher revision level ICs.

The four EPROMs on the ACU memory board contain both the ACU application program and the DCP application program. The ACU CPU runs the ACU application program directly from the ACU memory board. The DCP application program must first be downloaded from the ACU memory board to RAM storage in the DCP before it can be run by the DCP CPU.

Sites without a local OID (i.e., no RS232 connected for the primary OID) should attach a terminal to the primary OID port of the ACU 1A9J22 before proceeding.

1.2 SOFTWARE UPGRADE PROCEDURE

This procedure provides instructions to upgrade ASOS software by removing and replacing the four EPROMs on the ACU memory board and two EPROMS on each of the ACU CPU boards. After new EPROMs are installed, this procedure cold starts both the ACU and associated DCPs.

If the ACU EPROMs in the system are 1.70 or higher, the ACU is no longer cold started by removing battery jumper J22 (Figure 1) to clear all RAM on the board. The next step requires receiving a download of site-specific data from the AOMC. The DCPs are cold started by performing a hard reset of each DCP from the processor status page on the OID. After completion of the upgrade procedure, the EPROMs removed from the ACU memory board should be packaged in appropriate electrostatic discharge (ESD) protective material for return.

NOTE:

There may be an approximate 20-minute wait required to access the AOMC.

Tools and Materials Required: IC insertion tool
Small flat bladed screwdriver
Conductive foam
ESD strap

Step
1. If printer is on-line, remove it to off-line by pressing the **ON-LINE** switch located on the printer front panel.

CAUTION

Damage to equipment may result if power is not removed prior to removal or installation. Ensure that OUTPUT POWER switch is set to 0 (off) and facility power is removed.

To avoid damage to circuit boards and integrated circuits, use proper ESD handling procedures, including using a grounding strap when performing the following steps.

2. Set OUTPUT POWER switch on UPS status panel to 0 (off) position. The indicator for the OUTPUT status panel extinguishes.

3. Remove facility AC power from ACU cabinet.

4. Using a small flat blade screwdriver, loosen the captive screws located at top and bottom of ACU memory board 1A2A3 and loosen captive screws located at top and bottom of the ACU CPU boards lA2Al and lA2A2.

5. Press extractor handles at top and bottom of ACU CPU boards 1A2Al and lA2A2 and ACU memory board 1A2A3 in opposite directions to release board. Remove board from rack.

6. On underside of the ACU memory board, using a flat blade screwdriver, remove three screws and flat washers securing front panel to board. Remove board from front panel.

7. If the ACU EPROMS in the system are 1.70 or higher proceed to step 8, otherwise continue with step 7.

   Remove battery jumper J22 from ACU memory card. Jumper will be reinstalled during the installation procedure.

CAUTION

Throughout this procedure, discharge the screwdriver before and during use by touching tool to the grounded chassis surface. Failure to comply may result in damage to the integrated circuits.

8. From the front of the board, slide small flat blade screwdriver between integrated circuit **U7** and its IC socket. Carefully lift up on U7 to remove it from the socket as evenly as possible. After U7 is removed from the socket, place in a conductive foam or on some other static-free surface.

9. Repeat Step 8 for removal of the following integrated circuits U8, U17 and U21.

10. Remove U29 and U30 from the ACU CPU printed circuit boards 1A2A1 and 1A2A2 sockets and place the removed integrated circuits in a conductive foam or on some other static-free surface.

11. Using the IC insertion tool, remove the new EPROM ICs from protective packaging and insert them into the ACU memory board sockets in accordance with the following chart. Ensure that the EPROMs are installed with pin 1 (as identified by notch in top of IC) oriented toward board connector P1 and P2 as shown on Figure 1.

IC socket	IC part number
U8	62828-45002-1
U17	62828-45003-1
U7	62828-45004-1
U21	62828-45005-1

12. Use a small flat blade screwdriver, and install the three flat washers and screws. This will secure the front panel to the board.

13. Hold the ACU memory board by handles, position the board with the component side facing to the right and carefully slide board into VME rack on its guides. Align the board with the rear connector and press into place.

14. Use a small flat blade screwdriver and tighten the captive screws located at top and bottom of board.

15. Remove the new EPROMs ICs from the protective packaging. Use an IC insertion tool to insert the EPROMs into the ACU CPU board's sockets (1A2A1 and 1A2A2) in accordance with the following chart. Ensure that all the EPROMs are installed with pin 1 (as identified by notch in top of IC) oriented toward the top of the ACU CPU board as shown on Figure 2

IC socket	IC part number
U29	62828-45000-1

16. Holding the ACU CPU board by the handles, position the board with the component side facing to the right and carefully slide board into the card rack on its guides. Align the board with the rear connector and press into place.

17. Use a small flat blade screwdriver, and tighten the captive screws located at the top and bottom of the ACU CPU board.

18. This completes Modification Note 20. Complete Modification Notes 14 and 15 before going to step 19.

19. Apply facility power to ACU cabinet.

20. Set OUTPUT POWER switch to 1 (on) position

21. After the power is applied to the ACU, one of the PASS (Green) LEDs on the CPU should illuminate and the PASS LED on the other CPU will remain off. After approximately 1 minute, the LED that was off should start blinking.

22. Place the line printer on-line by pressing the **ON-LINE** switch located on the printer front panel. **ON-LINE** indicator illuminates.

23. With the power applied to the ACU and OID and after a brief warmup delay, the OID displays 1-minute data. If the display is not being updated, press the HELP key twice to refresh screen. The NEED SID AND AOMC PHONE message appears at top of screen. If this does not occur, return to REMOVAL procedure, step 1. Follow the steps until the ACU memory board is removed. Ensure the ACU EPROMs are installed correctly. Follow the INSTALLATION procedures to replace the ACU memory board.

24. At the OID, sign onto system as a "Technician."

25. Display the external communications page on the OID (sequentially press REVUE-SITE-CONFG-EXTRN keys from 1-minute display). Enter the phone number of AOMC (1-800-253-4717) into the AOMC PHONE NUMBER field and press the EXIT function key.

26. Display the site physical page on the OID (sequentially press REVUE-SITE-PHYS function keys from 1-minute display). Enter the three or four character SID code in the STATION IDENTIFIER field and press the EXIT function key. The system then calls the AOMC and receives a download of site-specific data.

27. Display the AOMC version page on the OID (sequentially press REVUE-SITE-VERSN-AOMC function keys from 1-minute display). This will allow you to observe that all the files are being downloaded from the AOMC. All status fields should read "COMPLETE" in approximately 5 minutes. Press EXIT.

NOTE: The following steps cold start the DCPs.

28. Display the maintenance page on the OID (press the MAINT function key from 1-minute display).

29. Use the PREV/NEXT keys, position the cursor over PROC field and press the SEL key. The OID displays the processor status page.

30. Use the PREV/NEXT keys, position the cursor over DCP #1 - HARD field and press the RESET key. Respond "YES" and "ENTER" to the "ARE YOU SURE?" message. The corresponding status field displays INITIALIZING while the unit is initializing. The progress of the download can be monitored by the PERCENT COMPLETE message that appears at the top of the screen. When the percent complete reaches 100, the DCP status field changes to RUNNING.

31. If the system contains more than one DCP, repeat step 19 for DCPs #2 and #3 as required.

FINAL ACTIONS

1. After the FMK has been completed, clear any maintenance flags that occur as a result of the restart.

2. Display the SW version page on the OID (sequentially press REVUE-SITE-VERSN-SW function keys from 1-minute display). The following fields should display version 2.2: MEMORY ACU APPLICATION EPROM, MEMORY DCP APPLICATION EPROM, and MEMORY DCP APPLICATION RAM. (These fields may take 5-10 minutes before they all read 2.2.)

3. Technicians must enter the second AOMC telephone number (1-800-434-1133) on the external communications page. Technicians should also enter site identifications for each AFOS dial backup telephone number. SHEF addresses must be entered on the external communications page. Specific addresses can be obtained from the local MIC/OIC. AFOS backup block and the AOMC 1200 baud fields should be **N**, for all sites in the conus.

ASSEMBLY DRAWING

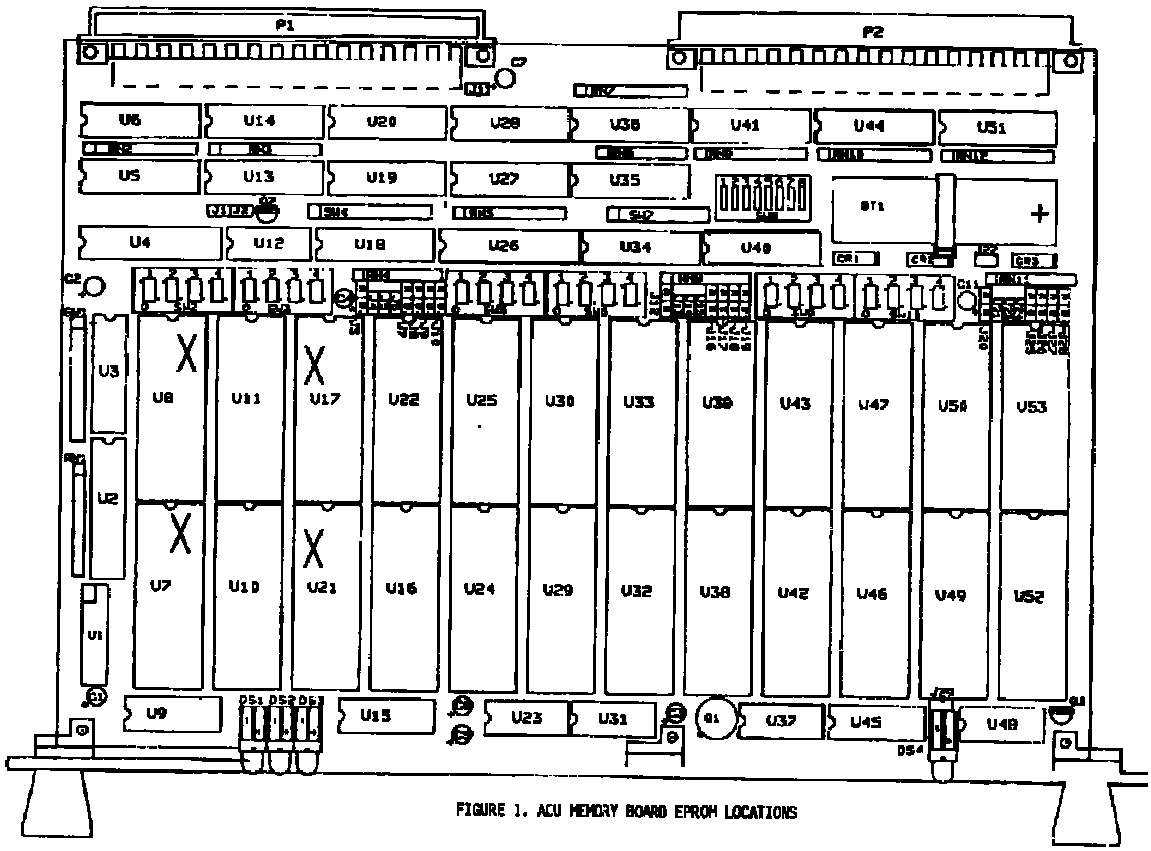


FIGURE 1. ACU MEMORY BOARD EPROM LOCATIONS

EPROM DESIGNATOR	PART NUMBER	FUNCTION
U8	62828-45002-1	BYTE 0
U17	62828-45003-1	BYTE 1
U7	62828-45004-1	BYTE 2
U21	62828-45005-1	BYTE 3

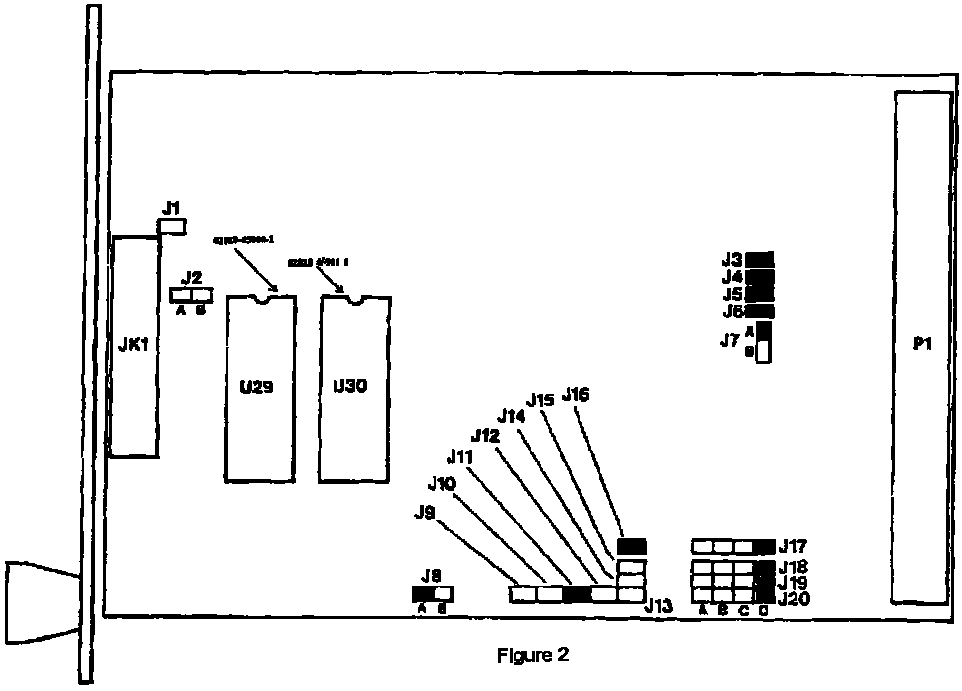

J1
J2
A B
JK1
U29
U30
J3
J4
J5
J6
J7
A
B
P1
J15
J16
J14
J12
J11
J10
J9
J8
A B
J13
J17
J18
J19
J20
A B C D

Figure 2

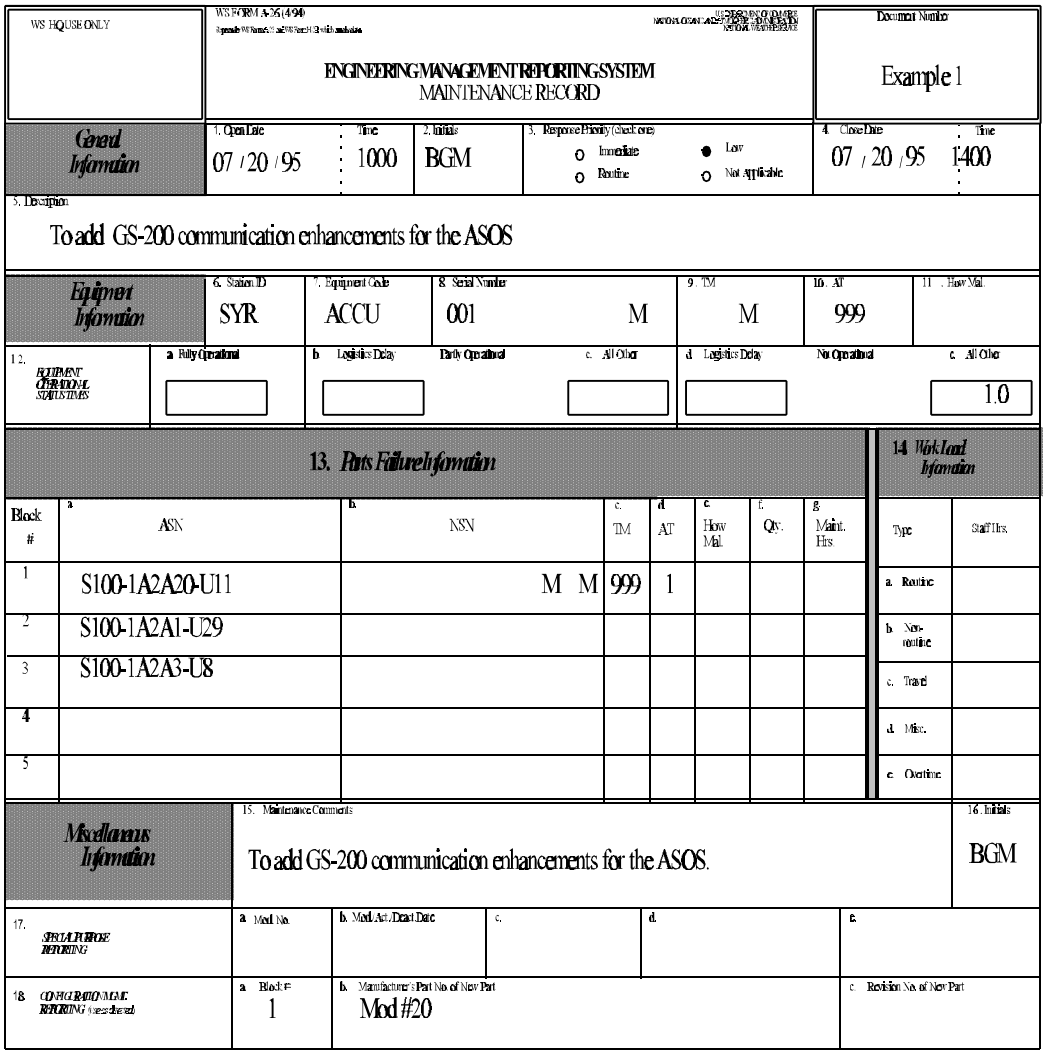
The test sites for version 2.2 were:

NWS Eastern Region	
	Akron, OH CAK
	Charleston, WV CRW
	Columbia, SC CAE
	Fitchburg, MA FIT
	Taunton, MA TAN
NWS Southern Region	
	Atlanta, GA ATL
	Memphis, TN MEM
	Orlando, FL MCO
	Tupelo, MS TUP
NWS Western Region	
	Missoula, MT MSO
	San Francisco, CA SFO
NWS Alaska Region	
	Anchorage, AK ANC

Operational Trouble Reports (OTR) Fixed in V2.2

TITLE/Summary

Version 2.2 of the ASOS ACU software incorporates revisions designed to improve the communications performance of sites using the FAA's GS-200 networks. Specifically, improved error recovery protocol has been added to handle line noise and other problems.



WS HQUSE ONLY

WS FORM A-26 (4-94)

ENGINEERING MANAGEMENT REPORTING SYSTEM
MAINTENANCE RECORD

Document Number: Example 1

General Information

1. Open Date	Time	2. Initials	3. Response Priority (Check one)	4. Close Date	Time
07 / 20 / 95	1000	BGM	o Immediate ● Low o Routine o Not Applicable	07 / 20 / 95	1400

5. Description:
To add GS-200 communication enhancements for the ASOS

Equipment Information

6. Station ID	7. Equipment Code	8. Serial Number	9. TM	10. AT	11. How Mal.
SYR	ACCU	001 M	M	999	

12. EQUIPMENT OPERATIONAL STATUS TIMES

a. Fully Operational	b. Logistics Delay	Partly Operational c. All Other	d. Logistics Delay	Not Operational e. All Other
				1.0

13. Parts Failure Information

Block #	a. ASN	b. NSN	c. TM	d. AT	e. How Mal.	f. Qty.	g. Maint. Hrs.
1	S100-1A2A20-U11	M M	999	1			
2	S100-1A2A1-U29						
3	S100-1A2A3-U8						
4							
5							

14. Work Load Information

Type	Staff Hrs.
a. Routine	
b. Non-routine	
c. Travel	
d. Misc.	
e. Overtime	

Miscellaneous Information

15. Maintenance Comments:
To add GS-200 communication enhancements for the ASOS.

16. Initials: BGM

17. SPECIAL PURPOSE REPORTING

a. Mod No.	b. Mod Act./Dead Date	c.	d.	e.

18. CONFIGURATION MGMT. REPORTING (as described)

a. Block #	b. Manufacturer's Part No. of New Part	c. Revision No. of New Part
1	Mod #20	

07S
0A6
1S4
21A
2B4
2B6
2V3
39J
3KM
3R5
3S2
3SM
3U6
47C
5B5
5C0
6R0
6V2
7G2
7MY
81J
8W5
9B9
A21
A8L
ABR
ADG
AFN
AHN
AIA
AKO
ALS
ALW
AMG
AMW
ANN
APN
ARA
AST
ASX
ATY
AVX
AXN
B20
BDE
BEH
BFD
BFF
BFM
BGD
BIG
BIH
BJJ
BKV
BLF
BLU
BML
BNO
BPI
BPK
BRD
BRW
BTM
BTT
BUY
BVO
BWG
BYG
BZN
C19
CAG
CAO
CDB
CDS
CEU
CEZ
CFV
CGI
CKV
CLM
CNK
CNU
CON
COT
CQX
CRS
CSM
CUB
CXO
DAG
DCU
DDC
DFI
DGW
DHT
DKK
DLN
DMO
DNL
DRA
DRO
DSV
DTN
DTO
DVN
E02
EAA
ELD
ELN
ELY
ELZ
EMP
ENN
EPH
EST
EWN
EYW
F54
F90
FCA
FDR
FFC
FFT
FHR
FIT
FLD
FOK
FST
FVE
GAG
GCK
GED
GEY
GGW
GIF
GKN
GLD
GLR
GMU
GOK
GRD
GSH
GVL
GWO
HAO
HBG
HBR
HDO
HEI
HIE
HKA
HKS
HLC
HOM
HON
HOT
HRO
HSI
HVR
HWV
I14
I15
IJD
IMT
INL
INW
IOW
IPL
IPT
ISN
ISW
IXD
JBR
JEF
JKL
JST
KAL
LAA
LAW
LBF
LBT
LBX
LEE
LFK
LGU
LHX
LOZ
LVM
LWC
LWS
LWV
M06
M50
M76
MAE
MAI
MCB
MCG
MCK
MCN
MEB
MEI
MFI
MGJ
MGW
MGY
MHK
MHS
MIW
MKL
MKO
MLC
MLP
MLS
MLT
MMV
MPV
MRH
MSL
MTH
MTJ
MVL
N00
N22
N63

N80
N97
NED
O18
O45
OFK
OFP
OGB
OLS
OME
ONO
ORE
ORT
OTZ
OVE
PAH
PAQ
PASY
PBF
PDT
PGD
PHD
PIR
PLN
PNC
PPF
PTW
PUW
PYM
RBG
RBL
RHI
RIL
RKP
RSL
RZZ
S22
SDB
SEG
SGY
SIT
SMP
SNY
SOV
SPW
SSF
SWD
SWO
SXT
T02
T27
T31
T39
TAL
TAN
TCL
TCS
TDZ
THV
TKI
TOI
TOP
TPH
TQE
TRL
TUP
U11
U73
UNO
VEL
VPC
VPZ
VSF
VTN
W52
WLD
WMC
WVI
X41